

Patent claims

1. Genetically modified plant cell, characterised in that it has a reduced activity of at least one OK1 protein in comparison with corresponding wild type plant cells that have not been genetically modified.
2. Genetically modified plant cell according to Claim 1, wherein the genetic modification consists in the introduction of at least one foreign nucleic acid molecule into the genome of the plant cell.
3. Genetically modified plant cell according to Claim 2, wherein the foreign nucleic acid molecule codes amino acid sequences, comprising amino acid sequences coding an OK1 protein.
4. Genetically modified plant cell according to one of Claims 2 or 3, wherein the said foreign nucleic acid molecule is chosen from the group consisting of
 - a) DNA molecules, which code at least one antisense RNA, which effects a reduction in the expression of at least one endogenous gene, which codes an OK1 protein;
 - b) DNA molecules, which by means of a co-suppression effect lead to the reduction in the expression of at least one endogenous gene, which codes an OK1 protein;
 - c) DNA molecules, which code at least one ribozyme, which splits specific transcripts of at least one endogenous gene, which codes an OK1 protein;
 - d) DNA molecules, which simultaneously code at least one antisense RNA and at least one sense RNA, wherein the said antisense RNA and the said sense RNA form a double-stranded RNA molecule, which effects a reduction in the expression of at least one endogenous gene, which codes an OK1 protein (RNAi technology);
 - e) Nucleic acid molecules introduced by means of *in vivo* mutagenesis, which lead to a mutation or an insertion of a heterologous sequence in at least one endogenous gene coding an OK1 protein, wherein the mutation or

insertion effects a reduction in the expression of a gene coding an OK1 protein or results in the synthesis of inactive OK1 proteins;

- f) Nucleic acid molecules, which code an antibody, wherein the antibody results in a reduction in the activity of an OK1 protein due to the bonding to an OK1 protein,
 - g) DNA molecules, which contain transposons, wherein the integration of these transposons leads to a mutation or an insertion in at least one endogenous gene coding an OK1 protein, which effects a reduction in the expression of at least one gene coding an OK1 protein, or results in the synthesis of inactive OK1 proteins; or
 - h) T-DNA molecules, which, due to insertion in at least one endogenous gene coding an OK1 protein, effect a reduction in the expression of at least one gene coding an OK1 protein, or result in the synthesis of inactive OK1 protein.
- 5. Plant cell according to one of Claims 1 to 4, which synthesises a modified starch in comparison with corresponding wild type plant cells that have not been genetically modified.
 - 6. Plant containing plant cells according to one of Claims 1 to 5.
 - 7. Plant according to Claim 6, which is a starch-storing plant.
 - 8. Plant according to Claim 7, which is a wheat or maize plant.
 - 9. Plant according to one of Claims 6, 7 or 8, which has a high starch (starch excess) phenotype.
 - 10. Propagation material of plants according to one of Claims 6, 7, 8 or 9, containing plant cells according to one of Claims 1 to 5.
 - 11. Harvestable plant parts of plants according to one of Claims 6, 7, 8 or 9, containing plant cells according to one of Claims 1 to 5.

12. Method for the manufacture of a genetically modified plant according to one of Claims 6, 7, 8 or 9, wherein
 - a) a plant cell is genetically modified, whereby the genetic modification leads to the reduction of the activity of an OK1 protein in comparison with corresponding wild type plant cells that have not been genetically modified;
 - b) a plant is regenerated from plant cells from Step a); and
 - c) if necessary, further plants are produced with the help of the plants according to Step b).
13. Method according to Claim 12, wherein the genetic modification in step a) consists in the introduction of at least one foreign nucleic acid molecule into the genome of the plant cell.
14. Method according to Claim 13, wherein the said foreign nucleic acid molecule is chosen from the group consisting of
 - a) DNA molecules, which code at least one antisense RNA, which effects a reduction in the expression of at least one endogenous gene, which codes an OK1 protein;
 - b) DNA molecules, which by means of a co-suppression effect lead to the reduction in the expression of at least one endogenous gene, which codes an OK1 protein;
 - c) DNA molecules, which code at least one ribozyme, which specifically splits transcripts of at least one endogenous gene, which codes an OK1 protein;
 - d) DNA molecules, which simultaneously code at least one antisense RNA and at least one sense RNA, wherein the said antisense RNA and the said sense RNA form a double-stranded RNA molecule, which effects a reduction in the expression of at least one endogenous gene, which codes an OK1 protein (RNAi technology);
 - e) Nucleic acid molecules introduced by means of in vivo mutagenesis, which lead to a mutation or an insertion of a heterologous sequence in at least one endogenous gene coding an OK1 protein, wherein the mutation or

insertion effects a reduction in the expression of a gene coding an OK1 protein or results in the synthesis of inactive OK1 protein;

- f) Nucleic acid molecules, which code an antibody, wherein the antibody results in a reduction in the activity of an OK1 protein due to the bonding to an OK1 protein,
 - g) DNA molecules, which contain transposons, wherein the integration of these transposons leads to a mutation or an insertion in at least one endogenous gene coding an OK1 protein, which effects a reduction in the expression of at least one gene coding an OK1 protein, or results in the synthesis of inactive OK1 proteins; and/or
 - h) T-DNA molecules, which, due to insertion in at least one endogenous gene coding an OK1 protein, effect a reduction in the expression of at least one gene coding an OK1 protein, or result in the synthesis of inactive OK1 protein.
15. Method according to one of Claims 12, 13 or 14, wherein the genetically modified plant synthesises a modified starch in comparison with corresponding wild type plants that have not been genetically modified.
16. Recombinant nucleic acid molecule containing a promoter, which initiates transcription in plant cells, and at least one nucleic acid sequence chosen from the group consisting of
- a) Nucleic acid sequences, which code at least one antisense RNA, which effects a reduction in the expression of at least one endogenous gene, which codes an OK1 protein;
 - b) Nucleic acid sequences, which by means of a co-suppression effect lead to the reduction in the expression of at least one endogenous gene, which codes an OK1 protein;
 - c) Nucleic acid sequences, which code at least one ribozyme, which splits specific transcripts of at least one endogenous gene, which codes an OK1 protein, and

- d) Nucleic acid sequences, which simultaneously code at least one antisense RNA and at least one sense RNA, wherein the said antisense RNA and the said sense RNA form a double-stranded RNA molecule, which effects a reduction in the expression of at least one endogenous gene, which codes an OK1 protein (RNAi technology).
17. Vector containing a recombinant nucleic acid molecule as defined in Claim 16 under a) to d).
 18. Host cell, which is genetically modified with a recombinant nucleic acid molecule according to Claim 16 or with a vector according to Claim 17.
 19. Composition containing a recombinant nucleic acid molecule as defined in Claim 16 under a) to d) or a vector according to Claim 17.
 20. Modified starch obtainable from a genetically modified plant according to one of Claims 6, 7, 8 or 9, from propagation material according to Claim 10, or from harvestable plant parts according to Claim 11.
 21. Method for the manufacture of a modified starch including the step of extracting the starch from a plant cell according to one of Claims 1 to 5.
 22. Method for the manufacture of a modified starch including the step of extracting the starch from a plant according to one of Claims 6, 7, 8 or 9, and/or from starch-storing parts of such a plant.
 23. Method for the manufacture of a modified starch including the step of extracting the starch from harvestable plant parts according to Claim 11.
 24. Use of plants according to one of Claims 6, 7, 8 or 9 for the manufacture of a modified starch.
 25. Modified starch obtainable by means of a method according to one of Claims 21, 22 or 23.
 26. Method for the manufacture of a derived starch, wherein modified starch according to Claim 20 or 25 or obtainable by means of a method according to one of Claims 21, 22 or 23 is derived.

27. Derived starch obtainable by means of a method according to Claim 26.
28. Use of modified starch according to one of Claims 20 or 25 for the manufacture of derived starch.